

WHAT IS CLAIMED IS:

1. A vehicle control system comprising:

an actuator control ECU, connected to an intra-vehicle communication network, for controlling an actuator that operates in synchronism with a crankshaft angle of a vehicle engine;

a sensor ECU, connected to the intra-vehicle communication network to which the actuator control ECU is connected, for receiving a crankshaft signal and a camshaft signal of the vehicle engine; and

a timing determining means,

wherein the sensor ECU includes crankshaft angle calculating means for calculating a crankshaft angle on the basis of the received camshaft signal and crankshaft signal and crankshaft angle outputting means for outputting the crankshaft angle calculated by the crankshaft angle calculating means to the timing determining means via the intra-vehicle communication network,

wherein the timing determining means is provided in one of ECUs that are connected to the intra-vehicle communication network and determines operation timing of the actuator on the basis of the received crankshaft angle, and

wherein the actuator control ECU includes timing control means for controlling the actuator on the basis of the timing determined by the timing determining means.

2. The vehicle control system according to claim 1, wherein the crankshaft angle outputting means further

outputs, to the timing determining means, via the intra-vehicle communication network, information relating to a crankshaft angle at a time point of outputting to the timing determining means.

5 3. The vehicle control system according to claim 1,
 wherein the timing determining means is provided in a timing
determination ECU that is connected to the intra-vehicle
communication network and is not the actuator control ECU or
the sensor ECU, and outputs the determined operation timing of
10 the actuator to the timing control means via the intra-vehicle
communication network.

 4. The vehicle control system according to claim 3,
 wherein the intra-vehicle communication network employs
15 a TDMA communication method, and

 wherein in the TDMA communication method the operation
timing determined by the timing determining means is assigned
to a time between a time slot that is assigned to transmission
from the sensor ECU and a time slot that comes first after the
20 former time slot and is assigned to the timing determination
ECU.

 5. The vehicle control system according to claim 1,
 wherein the timing determining means determines operation
25 timing of the actuator on the basis of a crankshaft angle received
immediately before and a crankshaft angle received one time before
using linearly extrapolated time dependency of the crankshaft

angle.

6. The vehicle control system according to claim 1,
wherein the sensor ECU includes failure diagnosing means
5 for performing a failure diagnosis on a crankshaft sensor and
a camshaft sensor.

7. A vehicle control system comprising:
an actuator control ECU, connected to an intra-vehicle
10 communication network, for controlling an actuator that operates
in synchronism with a crankshaft angle of a vehicle engine;
a sensor ECU, connected to the intra-vehicle communication
network, for receiving a crankshaft signal of the vehicle engine;
a camshaft ECU, connected to the intra-vehicle
15 communication network, for receiving a camshaft signal of the
vehicle engine; and
a timing determining means,
wherein the crankshaft ECU outputs information based on
the received crankshaft signal to the timing determining means,
20 wherein the camshaft ECU sends information based on the
received camshaft signal to the timing determining means,
wherein the timing determining means determines operation
timing of the actuator on the basis of the received information
based on the crankshaft signal and information based on the
25 camshaft signal,
wherein the actuator control ECU includes timing control
means for controlling the actuator on the basis of the timing

determined by the timing determining means, and

wherein the intra-vehicle communication network allows the crankshaft ECU to send the information based on the received crankshaft signal without losing it.

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8. A vehicle control system comprising:

an actuator control ECU, connected to an intra-vehicle communication network, for controlling an actuator that operates in synchronism with a crankshaft angle of a vehicle engine;

10 a sensor ECU, connected to the intra-vehicle communication network, for receiving a crankshaft signal of the vehicle engine; and

a timing determining means,

15 wherein the sensor ECU includes crankshaft angle calculating means for calculating a crankshaft angle on the basis of the received crankshaft signal and crankshaft angle outputting means for outputting the crankshaft angle calculated by the crankshaft angle calculating means to the timing determining means via the intra-vehicle communication network,

20 wherein the timing determining means is provided in one of ECUs that are connected to the intra-vehicle communication network and determines operation timing of the actuator on the basis of the received crankshaft angle, and

25 wherein actuator control ECU includes timing control means for controlling the actuator on the basis of the timing determined by the timing determining means.

9. The vehicle control system according to claim 8,
wherein the crankshaft angle outputting means further
outputs, to the timing determining means via the intra-vehicle
communication network, information relating to a crankshaft angle
at a time point of the outputting to the timing determining means.

10. The vehicle control system according to claim 8,
wherein the actuator is an electromagnetic valve.